

(12) UK Patent Application (19) GB (11) 2 094 258 A

(21) Application No 8206983

(22) Date of filing
10 Mar 1982

(30) Priority data

(31) 8101181

(32) 11 Mar 1981

(33) Netherlands (NL)

(43) Application published
15 Sep 1982

(51) INT CL³ B65B 5/10
59/00

(52) Domestic classification
B8C 40B1A 40B1C
40B1D1 40B1D3
40B1D5 40B1F2 40H3
U17

(56) Documents cited

GB 1472104

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GB 1260123

GB 1220939

GB 0864405

(58) Field of search

B8C

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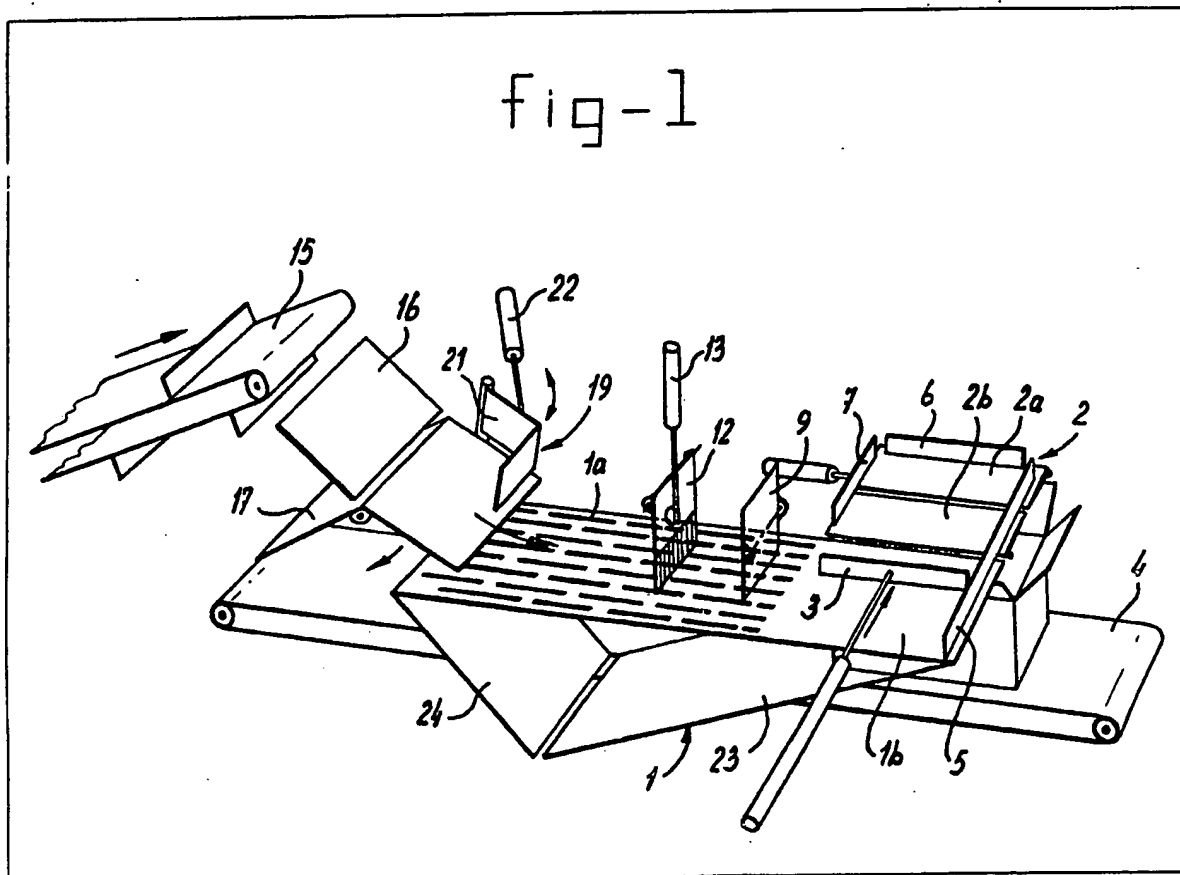
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(54) Apparatus for introducing
filled bags into a box

(57) An apparatus for automatically
introducing filled bags in a lying
position into a box, comprises a
conveyor (1) for supplying the lying
bags, a pusher member (3) to push
a number of bags from said con-
veyor (1) onto a discharge table (2),
and means for moving said dis-
charge table (2) from beneath the

bags thereon to discharge the bags
into a box therebelow. A counter
responsive to bags passing a pre-
determined position on the con-
veyor (1) and a further counter re-
sponsive to operation of the pusher
member (3) can be used to control
the number of bags per layer dis-
charged into the box. Additionally,
a counter responsive to operation of
the discharge table can be used to
control the number of layers depos-
ited in each box. A device (19) for
selectively rotating bags through
90° is provided upstream of the
conveyor (1).



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fig-2

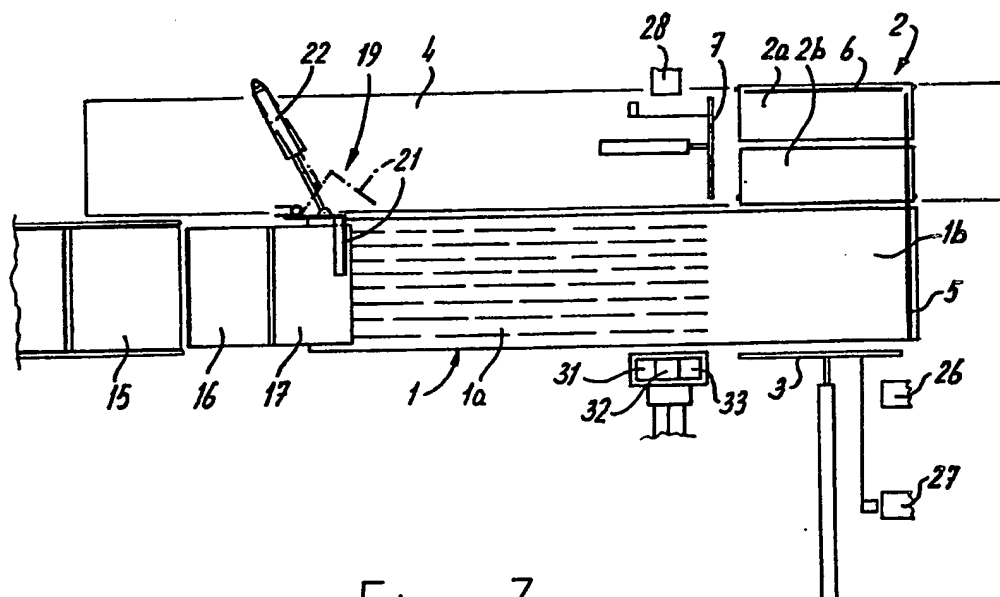
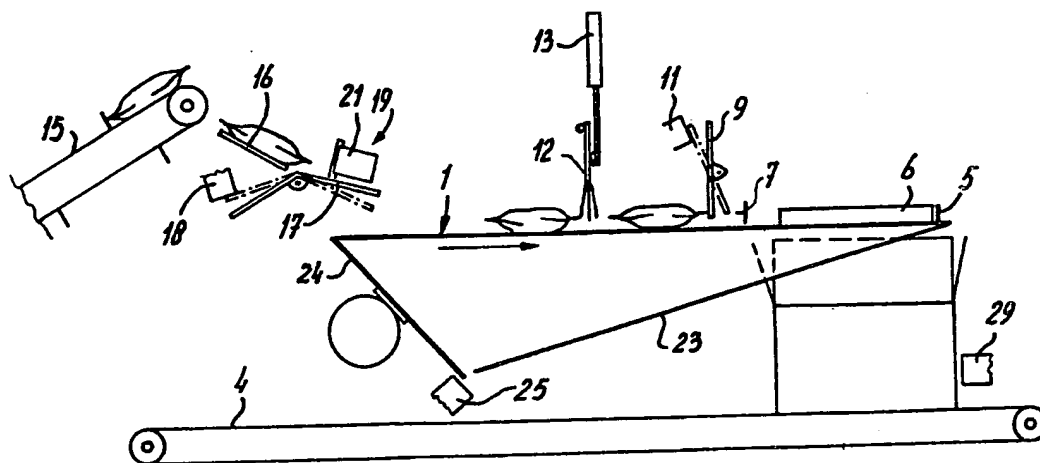


fig-3



SPECIFICATION

Apparatus for introducing filled bags into a box

- 5 The invention relates to apparatus for introducing filled bags into a box.
- Bags filled with loose material, such as deep-frozen French fried potatoes, do not generally have a fixed shape or size. This has to be considered in designing apparatus for packing such bags in boxes.
- A machine is known in which a plurality of stacked bags, oriented in a lying position, are clamped together between two plates and are pushed into a box, lying on its side face. After filling the box it is tilted up on to its bottom. The bags are then in an upright position. To fill the box as completely as possible it is necessary that the height of the box be substantially a multiple of the height of the bag. As in some branches of industry a great number of bag dimensions are used, in particular in the deep-freeze industry, this limitation is an important disadvantage.
- The most natural orientation of bags in a box is lying on the side. However, it has also to be considered that the bottom surface of boxes is determined by the standardized loading arrangement of the boxes on pallets, while the dimensions of the bags may differ substantially. A machine by which the bags can be introduced into a box in lying position should thus provide the possibility of altering in an easy way the pattern according to which the lying bags are arranged in each layer within the box.
- According to the present invention, there is provided an apparatus for introducing filled bags into a box, which apparatus comprises a conveyor for supplying the bags in lying position, a discharge table, means for moving a plurality of bags from the conveyor onto the discharge table and means for moving the discharge table from beneath the bags lying thereon into the discharge position.
- Such an apparatus can be used to introduce in an efficient and simple manner, and suitably completely automatically, filled bags in a lying position into a box. The bags arranged on the discharge table can simply be allowed to fall together into a box arranged below when the discharge table is moved to the discharge position.
- The means in the apparatus according to the invention for moving a plurality of bags from the conveyor comprises means for pushing a plurality of bags from the conveyor on to the discharge table.
- In order to be able to disturb the bags and in this way to reduce the dimensions of the bags parallel to the bottom of the box, the discharge table at the edges not adjoining the conveyor may be surrounded by retaining plates of which at least one retaining plate,

extending perpendicularly to the pusher, is movable in a direction perpendicular to the direction of movement of the pusher or other moving means.

- 70 In order to be able to vary the number of bags per row and the number of rows per layer dependent on the dimensions of the bag apparatus may be provided with means for counting the bags which pass a predetermined position on the conveyor, means to actuate the pusher when a predetermined number of bags has passed said position and means for moving the discharge table to the discharge position when the pusher has been activated a predetermined number of times.
- 80 The number of layers of bags per box can be determined by means of a device beneath the discharge table for supplying and discharging boxes and means are provided to actuate this supply and discharge device when the discharge table has been moved into the discharge position a predetermined number of times.
- For a variation in the pattern arrangement in a layer, it may also be required to orient at choice the bags with either their longitudinal direction or their transverse direction in the longitudinal direction of the box. For this in the supply track of the conveyor a device may be provided for rotating the lying bags through about 90°. It will be clear that this rotating device is not used when the supplied bags already have the correct orientation.
- The device for rotating the bags can be actuated in a simple manner by using an upwardly conveying belt terminating above a slide plate with a pivotable part such that under the weight of a bag the pivotable part may come into contact with a switch to actuate the device for rotating the bag through about 90°.
- Preferably the conveyor is formed by a vibrating conveyor with successively a conveyor face that is provided with openings and a closed conveyor face. Material which escapes from leaking bags can be discharged through the openings of the first mentioned conveying part. This material can be received beneath the part of the vibrating conveyor provided with openings in a receiving device for such material.
- It may be of importance that the leaking bag is removed and thus the receiving device may be provided with a signaling member to signal the presence of loose material.
- Care has to be taken that two or more abutting bags are not counted as one bag. For this it is preferred that above the conveyor there is provided a restraining plate which in one position prevents the passage of bags along the conveyor and in a second position permits bags to pass.
- The invention will be discussed in more detail with reference to the accompanying drawings in which an embodiment is shown

schematically. In the drawings:

Figure 1 shows in perspective a view of the schematically drawn apparatus.

Figure 2 is a plan view of the apparatus of

5 Fig. 1.

Figure 3 is a side view of the apparatus of Fig. 1.

The illustrated apparatus is destined to move bags filled with loose material, as
10 French fries, and in a lying position into a box according to an adjustable pattern or arrangement.

The main parts of the apparatus are a vibrating conveyor 1, a discharge table 2 and
15 a pusher 3. The latter is able to push a predetermined number of bags from the vibrating conveyor 1 onto the discharge table 2. The discharge table 2 in the illustrated embodiment comprises two pivotable parts 2a,
20 2b, that can be pivoted downwardly by actuation means which are not shown. It will be clear that the discharge table also may comprise a flat slide.

Beneath the discharge table 2 there is provided a conveyor belt 4 for boxes.

The vibrating conveyor 1 comprises a conveying plate 1a that is provided with openings and a closed conveying plate 1b.

Around the discharge table 2 three retaining plates 5, 6 and 7 are provided, of which
30 one (7) is movable perpendicularly to the direction of movement of the pusher 3.

Above the vibrating conveyor 1, there is a counting strip 9 which is pivoted about an horizontal axis, and which, see Fig. 3, may
35 touch a switch 11 connected to a counter to be discussed hereafter.

Seen in the direction of movement of the bags on the vibrating conveyor 1 in front of
40 the counting strip 9 there is a pivotable stopping plate 12 which retains the bags if, by means of the extended piston rod of a cylinder 13, pivoting of plate 12 is prevented. The piston rod of the cylinder 13 will for instance
45 be brought into the position in which pivoting of plate 12 is prevented when the previous, just passed, bag has not yet been counted. This avoids a plurality of abutting bags being signalled as one single bag by the counting
50 strip 9. Moreover the stopping plate 12 is in the non-pivoting position when it is not desired that bags are conveyed beyond this plate, for example when the pusher 3 is pushing a row of bags onto the discharge
55 table.

Near the supply end of the vibrating conveyor 1 an upwardly conveying belt 15 is provided ending above a slide plate 16 with
60 pivotable part 17. Under the weight of the bag this part 17 will move against a switch 18 (Fig. 3) which will be able to give a signal to a device 19 to rotate the bag through 90°. This can be necessary in connection with the desired pattern of the bags in a layer.

65 The device for rotating a bag through 90°

comprises an L-shaped plate 21 hinged to the piston rod of a pivotably mounted activating cylinder 22. It will be clear that a bag abutting the L-shaped plate 21 will be rotated

70 when the piston rod of the cylinder 22 is retracted (see the position of the plate 21 indicated with a broken line in Fig. 2). The activating signal for this comes from the switch 18 which abuts the pivotable part 17
75 of slide plate 16.

Beneath the conveying face of the vibrating conveyor 1 there are two inclined plates 23, 24 which guide any loose material, which has fallen through the openings in part 1a from a
80 leaking bag, to a feeler 25, which is able to give a warning signal and/or to bring the apparatus to a standstill when loose material is detected.

Adjacent the track of movement of the
85 pusher 3, there are provided two switches 26, 27 of which the switch 26 signals the end of the pushing stroke and switch 27 signals the return of pusher 3 to its initial position.

Next to the track of movement of the retaining plate 7 there is a switch 28 which signals
90 when this retaining plate is brought into the retaining position.

Above the conveyor belt 4 a switch 29 is provided which signals that a box is present
95 on said belt.

The device further comprises three adjustable counters 31, 32, 33. Counter 31 is in connection to the switch 11. The number of bags in a row can be adjusted therewith.

100 Counter 32 is connected to switch 26, the number of rows per layer can be adjusted with this switch.

Counter 33 receives signals of the operating mechanism of the discharged table 2. With
105 this counter the number of layers per box can be adjusted.

By means of a possible fourth counter can be taken care of the fact that a determined layer may be incomplete.

110 The apparatus works as follows:

By means of the upward conveying belt 15 bags are guided to the slide plate 16, 17. If it is necessary in connection with the chosen arrangement of the bags that these are rotated
115 through 90°, the device 19 is switched on. This device receives signals from the switch 18, which means that the cylinder 22 is actuated as soon as part 17 contacts the switch 18.

120 The bags, rotated or not rotated as desired, slide onto the vibrating conveyor 1 and are forwarded by this to the closed part 1b. As soon as the switch 11 has given to the counter 31 as many such signals as correspond with the adjustment of that counter (number of bags per row) the stopping plate
125 12 will be brought by the rod of cylinder 13 to the stop position and the pusher 3 will move the row of bags onto the discharge table 2. The end of the stroke of the pusher 3

is signalled by switch 26, which give a signal to the actuating device of the pusher plate, by which this returns to its initial position, signalled by switch 27. This switch then gives a signal to cylinder 13 by which the retaining of the bags by the stopping plate 12 is removed.

The switch 26 also gives a signal to the counting device 32. As soon as the adjustment of rows per layer is reached, which number corresponds to the number of times that the pusher plate has pushed row of bags onto the discharging table 2, the pusher 3 will keep its pusher position and a signal will be given to the actuating means of the movable blocking plate 7 by which this is moved into the retaining position.

The layer of bags now will be slightly disturbed by the plates 3 and 7 in cooperation with the fixed retaining plates 5 and 6.

The end of the stroke of the retainer plate 7 is signalled by the switch 28, which then activates the operating mechanism of the pivotable parts 2a, 2b of the discharge plate 2, in such a manner that these parts move away and the layer of bags falls in the box present below the same. Of course the parts 2a and 2b are only brought to this downwardly pivoted position when it is established by switch 29 that indeed a box is present.

After some time—determined by an adjustable time relay—the parts 2a and 2b of the discharge table 2, the retainer plate 7 and the pusher plate 3 are brought back to their initial positions.

With each discharge a signal is given to the counter 33. When the number of the charges (number of layers of bags) corresponds with the number adjusted on the counter 33, the full box will be discharged automatically, and the conveyor belt 4 will supply a new box.

Within the scope of the invention several modifications of the described and shown apparatus are possible. For example other constructions are possible for the discharge table and for the device for rotating the bag through about 90°.

As result of the possibilities of the adjustment of the position of the bag (transverse direction or longitudinal direction) the number of bags per row, the number of row per layer and the number of layers per box for each combination of boxes and product can be chosen in the most favourable way for packing.

CLAIMS

1. Apparatus for introducing filled bags into a box, which apparatus comprises a conveyor for supplying the bags in lying position, a discharge table, means for moving a plurality of bags from the conveyor onto the discharge table and means for moving the discharge table from beneath the bags lying thereon into the discharge position.

2. Apparatus according to claim 1,

wherein at its edges not adjoining the conveyor the discharge table is surrounded by retaining plates of which at least one retaining plate is movable in a direction perpendicular to the direction of movement of the plurality of bags.

3. Apparatus according to claim 1 or 2 wherein there are provided means for counting the bags which pass a predetermined position on the conveyor, means to actuate the means for moving a plurality of bags from the conveyor when a predetermined number of bags has passed said position, and means for moving the discharge table to the discharge position when the means for moving a plurality of bags from the conveyor has been activated a predetermined number of times.

4. Apparatus according to claim 3 wherein above the conveyor there is provided a restraining plate which in one position prevents the passage of bags along the conveyor and in a second position permits bags to pass.

5. Apparatus according to any one of the preceding claims wherein the means for moving a plurality of bags from the conveyor comprises means for pushing a plurality of bags from the conveyor on to the discharge table.

6. Apparatus according to any one of the preceding claims wherein beneath the discharge table there is provided a device for supplying and discharging boxes and means are provided to actuate this supply and discharge device when the discharge table has been moved into the discharge position a predetermined number of times.

7. Apparatus according to any one of the preceding claims wherein in the supply track of the conveyor a device able to rotate the lying bags through about 90° is provided.

8. Apparatus according to claim 7 which comprises an upwardly conveying belt terminating above a slide plate having a pivotable part such that under the weight of a bag the pivotable part may come into contact with a switch to actuate the device for rotating the bag through about 90°.

9. Apparatus according to any one of the preceding claims wherein the conveyor comprises a vibrating conveyor with successively a conveyor face that is provided with openings and a closed conveyor face.

10. Apparatus according to claim 9 wherein beneath the part of the conveyor having a face provided with openings there is provided a receiving device for any loose material from a leaking bag.

11. Apparatus according to claim 10 wherein the receiving device is provided with a signalling device which produces a signal when loose material is detected.

12. Apparatus for introducing filled bags into a box substantially as described with reference to and illustrated in the accompanying drawings.

Printed for Her Majesty's Stationery Office
by Burgess & Son (Abingdon) Ltd.—1982.
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London, WC2A 1AY, from which copies may be obtained.

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